10 Conclusions

In this concluding chapter I return to the central research question of this thesis, "what do the small surface concentrations of Metal Age artefacts in Mediterranean landscapes represent?", and give an overview of the answers, and further questions, I have found. I focus both on the RLPI program's methodological questions about formation processes and detectability, and my own interest in the interpretation of such sites within settlement and land use models.

In this thesis I have identified three main types of distortion in reconstructions of Metal Age settlement and land use in Italy: conceptual biases in archaeologists' ways of thinking about past societies, site formation processes, and methodological biases (Chapter 3). I then followed two approaches to counter these distortions in our understanding of Metal Age communities in northern Calabria. The first approach involved applying a systematic methodology for high-resolution, interdisciplinary investigations (Chapter 4) and was aimed at extracting more information from the existing dataset of 155 small Metal Age surface scatters recorded by the RAP field walking surveys. The investigations conducted by the RLPI program in the years 2010-2015 have yielded an impressive amount of new data (Chapter 5; Appendix 1) which has allowed both an evaluation of old and new field techniques (Chapter 5) and more robust interpretations of these sites in terms of anthropogenic and natural depositional and post-depositional processes (Chapter 7). The second approach focused on adding information about rural land use and annual exploitation cycles that we cannot extract from the fragmentary archaeological record itself. Using a literature review and non-systematic field observations, I aimed at a better understanding of how mountainous areas such as the Raganello basin may have been exploited in the past, and how small activity areas might fit into this (Chapter 8). The two approaches were brought together in Chapter 9, where I used the outcomes of the RLPI field work and the ethnographic study to fine-tune existing ways of thinking about Metal Age societies. This chapter contributes to the mitigation of the three bias types identified in Chapter 3.

In the following sections I discuss the contribution of my research within the RLPI program to unveiling the hidden landscape of rural, minimally stratified communities in Metal Age Italy. I focus both on the key issues of my work within the RLPI project and on the outcomes of my study of the interpretative potential of small surface sites:

- Human activities leading to the deposition of artefacts (section 10.1);
- Natural processes affecting the preservation, burial and exposure of archaeological deposits (section 10.2);
- Detectability of archaeological remains (section 10.3);
- Methodological advances in the study of Metal Age settlement and land use (section 10.4);
- Advances in the reconstruction of Metal Age settlement and land use (section 10.5).

10.1 Human activity leading to artefact deposition

In section 4.3.2, I formulated working hypotheses about the activities leading to artefact deposition in Metal Age societies, and about the places where we may find them. This was based on a review of current scholarship about Italian Metal Age societies (presented in section 2.3). I hypothesized that

the Metal Age inhabitants of the Raganello basin lived in small groups with a mixed subsistence economy based on small-scale agriculture and pastoralism. I assumed that suitable locations for this mixed subsistence strategy occur in various landscape parts, and that the most suitable locations would show more traces of use. The density of archaeological remains would thus be an indication of site longevity, use intensity and / or location preference. I also expected that traces of non-economic activity, such as burial, other forms of ritual activity, and territorial control, might remain.

The results of my study of the small artefact scatters in the Raganello basin confirm this expected range of activities. This is a great step forward in our understanding of Metal Age communities, as small artefact concentrations are rarely studied beyond surface recording and their interpretative potential is generally underexplored. Not only have I been able to distinguish different types of Metal Age settlement, I have also found evidence for symbolic behavior and for artefact deposition outside settlements.

The multidisciplinary approach of the RLPI program added chronological, functional, and depositional detail to the habitation clusters mapped by the RAP surveys in the open, undulating landscape zones of the foothills and the upland valley. The dense cluster of more or less contemporary FBA/EIA sites in the Contrada Damale, the cluster of scatters in the upland valley at Contrada Maddalena, and the new cluster of small artefact concentrations at the foot of the Timpa Sant'Angelo (uplands) illustrates both the social cohesion of Metal Age groups and their preference for certain locations. The upland valley and debris slopes below limestone rock faces were preferred in the earlier Metal Age phases, while the open undulating foothill zone at Contrada Damale became densely populated in the LBA. I interpreted the LBA habitation in the Contrada Damale as an 'open village' of dispersed but similar habitations, some of them with the burnt remains of a rectangular building. Evidence for non-economic activities within this cluster was attested by the find assemblage of site RB228. As was shown in Chapter 8, habitation clustering can be explained as a type of risk management in pre-mechanized societies, aimed at minimizing the effects of bad harvests and optimizing group survival through collaboration.

Long-lasting preferences for certain locations were attested in the uplands. The best example is site RB073 in Contrada Maddalena, where we recorded a deep stratigraphy of occupation traces from the EBA to the Roman period (section 5.3.3). Although we have not found the settlement producing these remains, the archaeological layers in the test pits and coring profiles at RB073 show that the area around the actual artefact scatter was intensively used during a long period.

The main contribution of my work within the RLPI program is that all investigated surface artefact concentrations are meaningful in an archaeological sense. None of the investigated sites was the result of accidental patterning caused by post-depositional processes (section 3.3.1.). A further major contribution to our understanding of archaeological surface concentrations is that stages in the biographies of sites and artefacts can be unveiled by high-resolution recording of surface and subsurface remains. Site RB073 is an eloquent example of the archaeological significance of secondary, or even tertiary, deposits occurring in refuse heaps and discard zones outside habitations. The archaeological layers documented in the test pits were dark and organic, and apart from bone material yielded only few, strongly abraded pottery fragments. This suggests that these layers consisted mainly of organic refuse which may have been used for fertilization. The test pits at this site plus the cores at sites RB174 and RB175 have contributed significantly to our understanding

of what the *impasto* scatters in the uplands represent: they cannot be interpreted as habitation foci, and highlight the importance of the study of landscape formation processes in the detection of archaeological remains (see section 10.2 below). Further evidence for secondary deposits producing surface materials come from the Contrada Damale, where storage vessel concentrations occur outside associated rectangular structures. They are probably the remains of middens and refuse heaps rather than the actual building, which underlines the observations made by Schiffer and LaMotta about deposit regimes and abandonment processes in habitations (section 3.3.3). The integration of archaeological and geophysical data shows that many artefact scatters are associated with pit-like features, including the burial pits found on the Monte San Nicola (sites RB216 and RB245a).

So far I have not been able to produce robust evidence for pastoral activity and the exploitation of animal products in the mountains and uplands. However, we did find an abundance of animal bones in all three MBA phases of site RB130 at Mandroni di Maddalena, including a concentration of *cervus elaphus* bone fragments that suggests hunting in the vicinity. At RB130 there are favorable circumstances for further research on the economic role of upland sites: we found structural remains in combination with well-preserved botanical and zoological material. I speculated about the use of paths, rock ledges and caves by shepherds on the basis of ethnographic sources (Chapter 8). Logistic and financial restrictions prevented us from investigating the small Metal Age scatters in the mountains, except for atypical site RB128 'Trizzone della Scala' where we could not establish the function of this site in wider land use (section 5.4). The site classes in the montane zone require further study before we can place them in Metal Age land use systems.

What do surface concentrations of Metal Age artefacts represent in the Raganello basin? My research has shown the following:

- Exposed remains of single Metal Age habitations or associated buildings in open, undulating landscape zones in the uplands and foothills (such as simple storage vessel site RB241)
- Exposed remains of secondary or tertiary deposits such as middens and discard heaps in the direct vicinity of a habitation (storage vessel site RB231)
- Exposed artefacts from secondary or tertiary deposits and occupation layers in natural depressions near habitations (storage vessel site RB219a; simple upland scatter RB073)
- Eroding artefacts from long-duration habitations in debris slopes (rich upland sites RB115a, RB121, RB130)
- Eroding artefacts from habitations with not exclusively subsistence functions (rich storage vessel site RB228)
- Exposed artefacts from burial contexts (sites RB216 and RB245a, Monte San Nicola)
- Exposed artefacts from activity areas without (detectable) traces of habitation or burial (atypical site RB128 'Trizzone della Scala'; cave sites)

10.2 Natural formation processes affecting the archaeological record

Landscape archaeological projects require an interdisciplinary research approach to fully appreciate the effects of depositional processes on archaeological distribution patterns. In this thesis I have argued that distribution maps cannot be interpreted in terms of socio-economic or socio-political dynamics without taking stock of the natural processes which preserve archaeological remains or make them disappear. In section 3.3, I summarized depositional and post-depositional processes which affect the preservation and detection of archaeological remains. These range from large-scale phenomena such as tectonic movement, uplift and subsidence, to local effects of bioturbation, trampling and scavenging. My studies in the Raganello basin illustrate the effects of such processes on the detectability of small-scale Metal Age settlement and land use, and show that they vary in the different landscape zones. For instance, subsidence and alluviation in the coastal plain bury potential pre- and protohistoric remains under meters of sediment, while erosion reinforced by ploughing exposes parts of sites in the Contrada Damale.

As was discussed in section 7.5.3, landscape formation processes have a large impact on the detection of archaeological remains in the upland valley near San Lorenzo Bellizi. Here we have mapped deep archaeological stratigraphies which occur over larger areas, but only very locally result in surface artefact scatters. At site RB073, secondary or tertiary anthropogenic deposits appear to have filled in a Pleistocene / early Holocene paleo-gully, which shows up in the magnetometry data as a sinuous, positive anomaly. The existence of this paleo-gully cannot be guessed at by looking at the present-day relief of the area, and only in our intensive multi-disciplinary approach could we reconstruct its course.

Further effects of natural depositional processes on the archaeological record can be seen in the locations of the rich upland scatters RB130 'Mandroni di Maddalena', RB121 'Timpa Sant'Angelo' and RB115a 'Terra Masseta', all three being situated on a debris slope at the foot of a limestone bluff. The test pit at site RB130 revealed a much deeper stratigraphy than we expected on the basis of manual augerings, and indicates that the formation processes in these debris slopes - rock fall, slope movement and the formation of dark, calcareous soils - are favorable to the preservation of archaeological remains. The stony soils in these locations present challenges for archaeological prospection. Since we encountered the oldest traces of human settlement in our area in exactly these places, I argue that we should overcome these challenges if we want to know more about early human occupation.

Natural processes not only affect the preservation of archaeological remains, but also their geophysical detectability, which depends on establishing a physical contrast between soils and anthropogenic features. Armstrong's geophysical work (Armstrong and Van Leusen forthcoming) showed that the conductivity, specific permittivity and resistivity properties of the soils in the Raganello basin do not produce meaningful contrasts, but that magnetic properties do. Using these contrasts, we were able to detect pits, gullies and rectangular buildings using magnetometry. Armstrong's MS work at sites such as RB073 has shown that anthropogenic soils are magnetically enhanced in comparison to the natural background. The contrasts are produced by various processes; apart from human-induced fire leading to thermoremanent features, we can also detect deposits which have an altered magnetic enhancement caused by bacteria. The effects of such very local natural formation processes on magnetic prospection of anthropogenic features are still poorly

understood by archaeologists, and merit additional study if we want to understand the range of magnetically detectable archaeological remains.

Detectable archaeological remains in the Raganello basin

- Surface artefact concentrations exposed by slope processes or human intervention (soil deflation; ploughing)
- Surface artefact concentrations relatively unaffected by slope processes (mountain tops)
- Magnetically enhanced anthropogenic deposits with clear contrast to natural surroundings, near-surface (such as the thermoremanent rectangular structures at RB219, RB231, RB244)
- Magnetically enhanced anthropogenic deposits in natural features, near-surface (natural depressions at RB073; RB219a)
- Buried anthropogenic deposits with archaeological indicators recognizable in coring
- Buried or ploughed up anthropogenic deposits with a clear MS contrast

10.3 Detectability of archaeological remains

As shown in section 5.2 and 5.3, archaeological remains are easy to detect in relatively shallow but relatively stable soils such as on the gravel fans of Pietra Catania and Contrada Damale, and on the marine terraces such as Monte San Nicola. Archaeological remains buried in shallow soils are more likely to be exposed at the surface due to slope movement and ploughing, where they can be recorded by field walking survey. Yet our studies in the Contrada Damale have shown that even in these landscape parts, sites remain undetected because they do not produce surface material. There we detected several rectangular features using magnetic gradiometry which cannot be associated with artefact concentrations on the surface (for instance RB219-A2; section 5.2.5). While these features appear to be unaffected by erosion or ploughing, they are buried within the detection range of our magnetometers. Given that there are also artefact scatters without an associated geophysical feature, the possibility must be faced that even under ideal detection circumstances such as in the Contrada Damale, there may be archaeological remains that do not produce either a surface scatter or a geophysical anomaly. We have not investigated this possibility because we were focused on known surface scatters, so that this type of bias remains for now unstudied.

Detectability is more problematic in the upland valley, as we have seen in our case studies at sites RB072, RB073, RB173a-e, RB174, and RB175 (section 5.3.3). None of these produced magnetic signals that can be interpreted as anthropogenic, but coring at these sites show that their surface detection is the result of local exposure of extended, buried archaeological layers. As was stated in section 7.5.3, this suggests that our pottery distribution maps for the upland valley are not a direct reflection of a habitation pattern, but rather signal areas of less deeply buried archaeological remains. This underlines my conviction that reconstructions of post-depositional processes are essential for our understanding of the archaeological surface record.

The detection of archaeological remains is affected by land management regimes. Agricultural terraces and lynchets (section 2.3.6) cause soil accumulation and deflation. On the hypothesis that archaeological remains may be preserved underneath terrace overburdens, out of reach of plough or other interventions, we investigated four locations were this may be the case, and excavated test pits in terraces walls to test this hypothesis (sites RB050, RB058, RB219d, RB228). At RB050 and RB228 did we establish the presence of undisturbed archaeological deposits underneath a lynchet, and archaeological materials actively being exposed by ploughing at its base (section 5.2). The other two terraces at RB058 and RB219d yielded colluvial layers with occasional archaeological artefacts, either producing the surface scatter by actively eroding in front of the terrace, or being already ploughed out completely. Although we have investigated only a small number of terrace sites, these observations suggest that the effect of terracing on archaeological detection lies both in the exposure of archaeological deposits through soil deflation at the base of terraces and in the occasional burial of remains underneath the overburden.

10.4 Advances in methodology

One of the RLPI aims was to develop a methodology for extracting more information from small Metal Age surface scatters and come to a better understanding of Metal Age rural landscapes. To this end, we have tested different approaches and techniques (introduced in section 4.4 and assessed in Chapter 6), and also added data from 'external', ethnographical sources (Chapter 8). Based on our experiences in the Raganello basin, recommendations can be made for the study of similar Metal Age Mediterranean landscapes. Recommendations for individual field techniques have already been given in Chapter 6; here I will focus on the contribution of the interdisciplinary use of geo-archaeology, geophysics, high-resolution artefact survey and ethnographical studies.

Interdisciplinarity

Merely collecting surface data is not enough for the study of past settlement and land use. As our studies have shown (sections 5.2 and 5.3), the surface record may be produced by a variety of depositional and post-depositional processes, and it is impossible to interpret surface scatters without an assessment of these. For instance, most storage vessel scatters occur up to several meters' distance from the nearest subsurface structures (Chapter 6). This might be caused by lateral movement of artefacts in the plough zone, but more probably by the nature of the ploughed out deposit: it may not be the structure itself producing the surface material, but an associated feature such as a midden or ditch. Such processes can only be exposed and understood by an interdisciplinary approach including surface recording and mapping of subsurface deposits and site formation processes.

Importance of geo-archaeological research, also off-site

Pedological and geomorphological studies are indispensable for landscape archaeological research, as illustrated by the RLPI studies in the upland valley: without coring, on and off-site, we would not have known that the surface scatter RB073 was produced not by a habitation, but by an exposed secondary deposit in a natural gully. Pedological studies are crucial to our understanding of surface distributions, but also for an assessment of site preservation. While stony Mediterranean soils are usually difficult to core into, and some caution is warranted in the interpretation of coring data, small soil pits are a quick way to document soils.

Geophysics

The RLPI studies have shown that geophysical prospection can be fruitful on non-monumental, small pre-classical sites. The work in the Contrada Damale is exemplary: for the first time, structural remains are attested in association with rural Metal Age ceramic concentrations. Even if we yet do not understand why some of these sites are associated with a rectangular feature, while others are not, and why some rectangular features have no surface expression, the fact remains that rural Metal Age settlement is detectable by geophysical means. On the Monte San Nicola, we detected circular pit-like features which helped us interpret the surface ceramics distribution. Magnetometry also helped us map natural subsurface features, some of which later turned out to be of archaeological relevance (such as the natural depression filled with secondary occupation deposits at site RB073).

Our focus on magnetic-based techniques was the pragmatic result of methodological tests (section 4.4.7). It should now be possible to select similar landscape zones for comparative studies, but also to select landscape zones where electro-magnetic and electrical techniques could be successful.

High-resolution surveys

The evaluation of field walking data (Chapter 6) reveals that our high-resolution surveys have added significantly to the site catalogue of the Raganello basin. In section 6.1.2 I have demonstrated that the detection of Metal Age surface scatters in the Raganello basin increases more than double by raising the survey coverage from 20% to 40%, since most Metal Age scatters in this area are smaller than 10 m in diameter. It is likely that similar small sites occur elsewhere in the Sibaritide and beyond.

The additional effort necessary for high-resolution surveys should be assessed in light of research aims. The RAP surveys were not aimed at mapping only the pre-classical landscape, but at reconstructing long-term settlement patterns from prehistory until the sub-recent period. High-resolution surveys at 40% or more would certainly require too much time and storage space for such a goal, unless a strict sampling approach is adopted. However, for understanding Metal Age settlement and land use, high coverage is essential in order to make associations with subsurface remains and understand local site formation processes, as was shown in Chapter 7.

The role of ethnographic data

Ethnographic studies are often conducted separately from archaeological landscape research, and the datasets from both disciplines are difficult to unite. In this thesis, I made an attempt at integrating data from both types of research by assuming socio-economic parallels between Metal Age agro-pastoralists and present-day Mediterranean farmers (sections 8.1 and 9.3). My aim for this was to fill a knowledge gap that archaeology cannot reduce, namely to provide information about human activity in small-scale agro-pastoralist societies. I am convinced that observations of the present and recent past improve our understanding of agricultural cycles, seasonality, infrastructure, location preference and pragmatism in ancient societies.

10.5 Advances in the reconstruction of Metal Age settlement and land use

An important conclusion that may be drawn from the work presented in this thesis is that systematic, high-resolution investigation of small surface scatters at the base of the settlement pyramid does yield a wealth of new insight into rural Metal Age life. These insights help us mitigate the persistent biases discussed in Chapter 3 and, for the first time, reconstruct the development of Metal Age rural landscapes in southern Italy.

As was highlighted in the text box "What do surface concentrations of Metal Age artefacts represent in the Raganello basin?" above, the high-resolution investigations in the Raganello basin confirm that surface scatters are the product of a range of human activities in the past. I expected this range on the basis of published excavation reports discussed in section 2.3. The interdisciplinary RLPI approach enabled us to recognize single habitations and related deposits, but also burials and other non-habitation activity areas in a dataset of small surface scatters. These observations put the spotlight on the interpretative potential of seemingly unpromising surface artefact concentrations, and in future research may help us answer the question whether similar settlement types and densities occur in other parts of the Sibaritide, elsewhere in Italy, and further afield. The high detectability of FBA/EIA habitations as established in the Contrada Damale through archaeological field walking and magnetometry offers ample opportunity to test whether this dispersed type of settlement is unique for the Raganello basin, or not.

Aside from the good results obtained in the foothills, the RLPI has contributed to unveiling the hidden upland and mountain landscapes. Our studies in the uplands have shown that this landscape zone is not marginal at all in archaeological terms; in fact, the oldest traces of stable human settlement are now documented in the upland valleys of San Lorenzo Bellizzi and Terra Masseta. This underscores the archaeological potential of underexplored 'peripheries' for our understanding of Metal Age settlement and land use, as well as the non-incidental nature of upland exploitation during late prehistory and protohistory. While the site formation processes in the uplands pose challenges to archaeological research, our studies have shown that minimally invasive work (manual augering and small test pits) allows us to extract information from rocky debris slopes and areas of strong soil accumulation (sites RB130, RB073, RB175). These observations open up new research possibilities, for instance to investigate what settlement and land use consisted of in the upland valley, and whether this was seasonal or permanent.

An important contribution of the RLPI project is the improved dating of investigated surface scatters. This is the result of detailed material studies and of robust C14-dates from excavated contexts. We attested a longer chronological framework for the pre-colonial settlement cycle than was previously thought (Peroni and Trucco 1994). The RLPI studies have shown that the uplands were used from the Neolithic onwards, confirming previous pollen studies (Kleine *et al.* 2003; Woldring *et al.* 2006). Until now, Neolithic finds are known only from limestone-associated locations (sites RB115a Terra Masseta and RB121 Timpa Sant'Angelo), but we have confirmed that the open upland valley was in use at least from the EBA. Our improved knowledge of material culture through the Metal Ages in the Raganello basin now allows to reconstruct shifting settlement patterns (section 9.4). The absence of Iron Age material categories in our surface collections remains unexplained, which makes understanding the transition to the IA one of the pressing open issues in our area.